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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,372	10/03/2003	Radu Victor Balan	2002P16408US01	4024

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Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, NJ 08830

EXAMINER	
PAUL, DISLER	
ART UNIT	**PAPER NUMBER**
2615	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

Office Action Summary	**Application No.** 10/678,372	**Applicant(s)** BALAN ET AL.
	Examiner Disler Paul	**Art Unit** 2615

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,11,12 and 15-17* is/are rejected.

7)☒ Claim(s) *1,9-10 and 13-14 and 16-17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1,9,16-17 are objected to because of the following informalities:

   a. In claims 1,16-17 Applicant need to further define the parameter $\alpha(w)$.
   b. In claim 9, Applicant need to further defined the parameters disclosed.

. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-6,8,11-12,15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu et al. ("US 2004/0047464 A1") and Balan et al. ("ICA2001 conference 12/01").

Reclaim 1, Yu et al. discloses a method for eliminating or reducing an unwanted signal from a recorded mixture of a desired signal and an unwanted signal given an original recording of the unwanted signal ("*fig.1-3; page 1[0012] line 7-10; page 2[0014] line 4-6-two sensors to pick up mixed and null/undesired signals so as to remove noises*"), comprising: aligning the recorded mixture and the original recording("page 1[0010] line 3-4-microphones of mix and original are arranged/aligned"); computing a frequency representation of the recorded mixture to create a frequency recorded mixture("*fig.8/81-served as to determine the frequency*"); computing a frequency representation of the redefined original recording to create a frequency redefined original recording("*fig.8/83;page 5[0076] line 1-5*"); determining a segment of time when only the redefined original recording is present in the recorded mixture("*page 2[0018] line 5-6-detectors to determined segment of time when in the mixing signal only noise is detector and further see page 3[0029]*"); computing a value .alpha.(.omega.)("*fig.7/71-filters being determined based on coefficient of (mix and noisy/null) frequency signals at fig.8/89*"); inverting the time-frequency desired signal("*fig.8/90-converting the desired signal into time domain*") to create a desired signal("*Fig.1-2/(16-the output desired signal*"). While Yu et al. teaches the above, He fails to teach computing the representation of the recorded mixture and redefined original signals to be specifically of time-frequency. However, Balan et al. teach a real-time version of the Duet algorithm in which computing the time-frequency representation of sources ("*page 1[intro] line 3-10*") for the purpose of separating sources signals. Therefore taking the combined teaching of Yu et al. and Balan et al. as a whole, it would have been obvious for one of the ordinary skill in the art to modify Yu et al. by incorporating the computing the representation of the recorded mixture and redefined original signals to be specifically of time-frequency for the purpose of separating sources signals.

The modified combined teaching of Yu et al. and Balan et al. as a whole teach the above, However, the recently combined teaching fail to teach generating a time-frequency mask using the value .alpha.(.omega.), the time-frequency recorded mixture and the time-frequency redefined original recording; applying the time-frequency mask on the recorded mixture to compute a time-frequency desired signal. However, in further explanation Balan et al. did disclose of generating a time-frequency mask using the a filter, the time-frequency of sounds; applying the time-frequency mask on the recorded mixture to compute a time-frequency desired signal ("*page3[Demix] line 1-10*") for the purpose of Demixing/separating particular sources signal. Therefore taking the now modified combined teaching of

Yu et al. and Balan et al. as a whole, it would have been obvious for one of the ordinary skill in the art to incorporate the feature of generating a time-frequency mask using the value .alpha.(.omega.)/filter, the time-frequency of sounds in this case being the recorded mixture and the time-frequency redefined original recording; applying the time-frequency mask on the recorded mixture to compute a time-frequency desired signal for the purpose of Demixing/seperatiang particular sources signal.

Re claim 2, the method of claim 1, wherein aligning the recorded mixture and the original recording comprises: estimating a delay between the recorded mixture and the original recording ("*Yu,page 5[0072] line 5-7-a delay circuit is added to have a delay enhanced/mix signal with respect to the original/null signal*"); However, Yu et al. is silent in regard to redefining the original recording with respect to a delay between the recorded mixture and the original recording to create a redefined original recording; However, Yu et al. disclose the delay signal("*fig.5/51*") which created a delay enhanced/mixing signal with respect to the original/null signal("*fig.5/54; page 5[0072] line 7*"), therefore, it is inherent that the original signal must be redefined with respect to the delay that exist between the recorded mixture and original recording.

Re claim 3, the method of claim 2, However, the combined teaching of Yu et al. and Balan et al as a whole, fail to teach the estimating a delay between the recorded mixture and the original recording comprises manually estimating the delay through optical inspection. However, the feature of estimating a delay between the recorded mixture and the original recording comprises manually estimating the delay through optical inspection commonly known, official Notice is taken that it would have been obvious for one skill in the art to estimate a delay between the recorded mixture and the original recording comprises manually estimating the delay through optical inspection for purpose of aligning the signals.

Re claim 4, the method of claim 2, wherein estimating a delay between the recorded mixture and the original recording comprises performing cross-correlation alignment ("*Yu,fig.8/86; page 5[0078]-delay between mix and original signals is done by cross correlation*").

Re claim 5, the method of claim 1, however, he is silent in regard to the computing a time-frequency representation of the recorded mixture to create a time-frequency recorded mixture comprises computing the specific:

$$F^{w}(x(*))(t,w) = \frac{1}{\sqrt{2\pi}}\int_{\infty}^{\infty} w(\tau - t)x(\tau)e^{-iwt}d\tau$$

. However, he did disclose computing a frequency representation of the recorded mixture ("*Yu,fig.8/81*") and he further discloses the parameter in determining powers ("*Yu,page 6[0093] line 1-3*") and the Fourier transform ("*page 5[0075] line 3*"), which is commonly denoted as being for examples in the encyclopedia as being explained to be:

Definition

Suppose x is a complex-valued Lebesgue integrable function. The Fourier transform to the frequency domain, ω, is given by the function:

$$X(\omega) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty} x(t)e^{-i\omega t}\,dt, \quad \textit{for every real number } \omega.$$

When the independent variable *t* represents *time* (with SI unit of seconds), the transform variable ω represents angular frequency (in radians per second).

Other notations for this same function are: $\hat{x}(\omega)$ and $\mathcal{F}\{x\}(\omega)$.

Thus, it is inherent that the specific computation of

$$F^{w}(x(*))(t,w)=\frac{1}{\sqrt{2\pi}}\int_{\infty}^{\infty}w(\tau-t)x(\tau)e^{-iwt}d\tau$$

is used by Yu et al. in determining the frequency of recorded mixture by mean of the fourier transform with parameters/windows.

Re claim 6, with regard to redefined original recording has been analyzed and rejected with respect to claim 5 above

Re claim 8, the method of claim 1, wherein determining a segment of time when only the redefined original recording is present in the recorded mixture comprises determining a segment of time when the desired signal is not present in the Mixture("*Yu,page 2[0018] line 5-6"*).

Re claim 11, the method of claim 1, wherein computing a value .alpha.(.omega.) comprises computing adaptive updates to the value .alpha.(.omega.)("*page 5[0075] line 6-8; fig.7/71- the value .alpha.(.omega.) is the absolute filter value being updated*").

Re claim 12, the method of claim 1, wherein generating a time-frequency mask using the time-frequency recorded mixture and the time-frequency redefined original recording comprises computing:

$$m(t,w) = \begin{cases} 1 \ldots if \ \dfrac{|x(t,w)|^2}{a^2(w)|r(t,w)|^2} \rangle \alpha \\ 0 . if \ldots otherwise \end{cases}$$

("*Balan,page 55 eq.(28-29)*").

Re claim 15, with regard to inverting the time-frequency, has been analyzed and rejected with respect to claim 5.

Re claim 16, with regard to a machine-readable medium having instructions stored thereon for execution by a processor to perform a method, has been analyzed and rejected with respect to claim 1.

Re claim 17, with respect to time-scaling has been analyzed and rejected with respect to claim 1.

4. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yu et al. ("US 2004/0047464 A1") and Balan et al. ("ICA2001 conference 12/01") and further in view of Bizjak (US 2002/0172378 A1").

Re claim 7, the method of claim 1, wherein determining a segment of time when only the redefined original recording is present in the recorded mixture ("*page 2[0018] line 5-6- detectors to determined segment of time when in the mixing signal only noise is detector and further see page 3[0029]*"), However, the combined teaching of Yu et al. and Balan et al. as a whole fail to teach the determining a segment of time when the desired signal is not of a sufficient auditory level to be heard by a human. But, Bizjak discloses a distributed signal processing system in which determining a segment of time when the desired signal is not of a sufficient auditory level to be heard by a human("*page 1[0008] line 11-13*") for the purpose of enabling a listener to comfortably hear all portions of an audio signal due to environment noise. Therefore, taking the combined teaching of Yu et al. and Balan et al. and Bizjak as a whole, it would have been obvious for one of ordinary skill in the art to incorporate the feature of determining a segment of time when the desired signal is not of a sufficient auditory level to be heard by a human in Yu et al. and Balan et al. as whole, for purpose of enabling a listener to comfortably hear all portions of an audio signal due to environment noise.

Allowable Subject Matter

4. Claims 9-10,13-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Krasny et al.("US 2002/0126856 A1") discloses a noise reduction apparatus consist of training and working signals to reducing noises.

Desiardins ("US 5,874,916") discloses the methods in signal processing wherein components of signals of interest are identified in the presence of noise using time-frequency.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Disler Paul whose telephone number is 571-272-2222. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DP

VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600
2/5/07